

**WHAT IS CLAIMED IS:**

1           1.       A system for testing a physical attribute of a manufactured object, the testing  
2       comprising generating an ultrasonic signal associated with the manufactured object with at least  
3       one laser pulse and measuring the ultrasonic signal with a two wave mixing interferometer, the  
4       two-wave mixing interferometer having a probe beam of coherent electromagnetic energy and a  
5       pump beam of coherent electromagnetic energy, the probe beam of coherent electromagnetic  
6       energy being scanned across the manufactured object.; the probe beam of coherent  
7       electromagnetic energy reflecting from the manufactured object with an altered wave  
8       characteristic caused by a scanning motion of the probe beam, the system comprising:  
9       at least one wave characteristic adjusting device coupled to the two-wave mixing interferometer;  
10      and  
11      the at least one wave characteristic adjusting device operable to adjust a wave characteristic of at  
12      least one beam of coherent electromagnetic energy; the wave characteristic adjustment  
13      compensating for the altered wave characteristic caused by the scanning motion of the probe  
14      beam of the two-wave mixing interferometer.

1           2.       The system of Claim 1 wherein the at least one wave characteristic adjusting  
2       device is situated in the optical path of the pump beam.

1           3.       The system of Claim 1 wherein the at least one wave characteristic adjusting  
2       device is situated in the optical path of the probe beam.

1           4.       The system of Claim 1, the system further comprising:  
2       a wave characteristic controlling system, the wave characteristic controlling system operable to  
3       direct the at least one wave characteristic adjusting device.

1           5.       A system for measuring a physical attribute of a manufactured object, the system  
2       comprising:  
3       a sonic energy signal generator;  
4       the sonic energy signal generator initiating at least one sonic energy signal associated with the  
5       manufactured object;  
6       a two-wave mixing interferometer;  
7       the two-wave mixing interferometer having a pump beam of coherent electromagnetic energy  
8       and a probe beam of coherent electromagnetic energy, the probe beam of coherent  
9       electromagnetic energy being scanned across the manufactured object, the probe beam reflecting

10 from the object with an altered wave characteristic caused by the scanning motion of the probe  
11 beam; and  
12 at least one wave characteristic adjusting device coupled to the two-wave mixing interferometer,  
13 the at least one wave characteristic adjusting device adjusting a wave characteristic of at least  
14 one beam of coherent electromagnetic energy;  
15 the wave characteristic compensating for the altered wave characteristic caused by the scanning  
16 motion of the probe beam of the two-wave mixing interferometer.

1 6. The system of Claim 5 wherein the at least one wave characteristic adjusting  
2 device is situated in the optical path of the probe beam of coherent electromagnetic energy.

1 7. The system of Claim 5 wherein the at least one wave characteristic adjusting  
2 device is situated in the optical path of the pump beam of coherent electromagnetic energy.

1 8. The system of Claim 5, the system further comprising:  
2 a wave characteristic controlling system, the wave characteristic controlling system operable to  
3 direct the at least one wave characteristic adjusting device.

1 9. The two-wave mixing interferometer of Claim 8 wherein the first beam is a pump  
2 beam of the two-wave mixing interferometer and the second beam is the probe beam of the two-  
3 wave mixing interferometer.

1 10. A two-wave mixing interferometer for detecting a sonic energy signal about a  
2 manufactured object, the two-wave mixing interferometer scanning a probe beam across a  
3 surface of the manufactured object, the two-wave mixing interferometer comprising:  
4 at least one coherent electromagnetic energy generator, the at least one coherent electro-magnetic  
5 energy generator generating at least one beam of coherent electromagnetic energy;  
6 at least one wave characteristic controlling circuitry, the at least one wave characteristic  
7 controlling circuitry communicatively coupled to the at least one coherent electromagnetic  
8 energy generator; and  
9 the at least one wave characteristic controlling circuitry operable to adjust a wave characteristic  
10 of the at least one beam of coherent electromagnetic energy to compensate for the wave  
11 characteristic distortion caused by a scanning motion of the probe beam of the two-wave mixing  
12 interferometer.

1 11. The two-wave mixing interferometer of Claim 10 wherein the at least one beam  
2 of coherent electromagnetic energy is the probe beam of the two-wave mixing interferometer.

12. The two-wave mixing interferometer of Claim 10 wherein the at least one beam of coherent electromagnetic energy is a pump beam of the two-wave mixing interferometer.

13. The two-wave mixing interferometer of Claim 10, the two-wave mixing interferometer further comprising:  
a wave characteristic controlling system communicatively coupled to the wave characteristic controlling circuitry; and  
the wave characteristic controlling system operable to direct the wave characteristic controlling circuitry.

14. A wave characteristic adjusting device for adjusting a wave characteristic of a beam of coherent electromagnetic energy, the beam of coherent electromagnetic energy being of a two-wave mixing interferometer, the frequency shifting device comprising:  
an electro-optic polarizer situated in a path of the beam of coherent electromagnetic energy;  
a polarized beam deflector situated in the path of the beam of coherent electromagnetic energy;  
a first electro-optic phase modulator;  
a second electro-optic phase modulator;  
the beam of coherent electro-magnetic energy selectively passing through the polarized beam deflector to the first electro-optic phase modulator if the electro-optic polarizer has a first specific operating characteristic;  
the electro-optic phase modulator continuously altering a wave characteristic of the beam of coherent electromagnetic energy;  
the beam of coherent electromagnetic energy selectively deflecting from the polarized beam deflector to the second electro-optic phase modulator if the electro-optic polarizer has a second specific operating characteristic;  
the second electro-optic phase modulator continuously altering the wave characteristic of the beam of coherent electromagnetic energy;  
the electro-optic polarizer operable to switch modes; and  
the wave characteristic of the beam of coherent electromagnetic energy being altered to compensate for a wave characteristic distortion caused by a scanning motion of a probe beam of the two-wave mixing interferometer.

15. The wave characteristic adjusting device of Claim 14 wherein the beam of coherent electromagnetic energy is the probe beam of the two-wave mixing interferometer.

1           16.     The wave characteristic adjusting device of Claim 14 wherein the beam of  
2 coherent electromagnetic energy is a pump beam of the two-wave mixing interferometer.

1           17.     A wave characteristic adjusting device for adjusting a wave characteristic of a  
2 beam of coherent electromagnetic energy, the beam of coherent electromagnetic energy being of  
3 a two-wave mixing interferometer, the wave characteristic adjusting device comprising:  
4 at least one electro-optic phase modulator;  
5 the at least one electro-optic phase modulator situated in a path of the beam of coherent  
6 electromagnetic energy; and  
7 the at least on electro-optic phase modulator operable to adjust a wave characteristic of the beam  
8 of coherent electromagnetic energy by a specific amount in a specific direction, the wave  
9 characteristic adjustable to compensate for a wave characteristic distortion caused by a scanning  
10 motion of a probe beam of the two-wave mixing interferometer.

1           18.     The wave characteristic adjusting device of Claim 17 wherein the beam of  
2 coherent electromagnetic energy is the probe beam of the two-wave mixing interferometer.

1           19.     The wave characteristic adjusting device of Claim 17 wherein the beam of  
2 coherent electromagnetic energy is a pump beam of the two-wave mixing interferometer.

1           20.     A wave characteristic adjusting device for adjusting a wave characteristic of a  
2 beam of coherent electromagnetic energy, the beam of coherent electromagnetic energy being of  
3 a two-wave mixing interferometer, the wave characteristic adjusting device comprising:  
4 a plurality of electro-optic phase modulators;  
5 the plurality of electro-optic phase modulators situated such that the beam of coherent  
6 electromagnetic energy may selectively pass through at least one of the plurality of electro-optic  
7 phase modulators; and  
8 the plurality of electro-optic phase modulators operable to adjust the wave characteristic of the  
9 beam of coherent electromagnetic energy by amounts and in directions selectively determined,  
10 the wave characteristic of the beam of coherent electromagnetic energy being adjusted to  
11 compensate for a wave characteristic distortion caused by a scanning motion of a probe beam of  
12 the two-wave mixing interferometer.

1           21.     The frequency shifting device of Claim 20 wherein the beam of coherent electro-  
2 magnetic energy is a probe beam of coherent electromagnetic energy of the two-wave mixing  
3 interferometer.

1           22.     The frequency shifting device of Claim 20 wherein the beam of coherent electro-  
2 magnetic energy is a pump beam of coherent electromagnetic energy of the two-wave mixing  
3 interferometer.

1           23.     A system for detecting a sonic energy signal associated with a manufactured  
2 object, the system comprising:  
3 a probe beam of coherent electromagnetic energy;  
4 a pump beam of coherent electromagnetic energy;  
5 the probe beam being scanned across a surface of the manufactured object;  
6 the probe beam reflecting from the manufactured object with an altered wave characteristic  
7 indicative of a scanning motion of the probe beam;  
8 the probe beam being directed to a two-wave mixing interferometer;  
9 either one of the probe beam or the pump beam of coherent electromagnetic energy passing  
10 through a wave characteristic adjusting device, the wave characteristic adjusting device  
11 communicatively coupled to a wave characteristic controlling system;  
12 the wave characteristic adjusting device operable to adjust a wave characteristic of the either one  
13 of the probe beam or pump beam;  
14 the either one of the probe beam or the pump beam being directed to the two-wave mixing  
15 interferometer; and  
16 the wave characteristic controlling system operable to direct the wave characteristic adjusting  
17 device to adjust the wave characteristic of the either one of the probe beam or the pump beam.

1           24.     The system of Claim 23, the system further comprising:  
2 the two-wave mixing interferometer communicatively coupled to the wave characteristic  
3 controlling system, the two-wave mixing interferometer passing data to the wave characteristic  
4 controlling system; and  
5 the wave characteristic controlling system directing the wave characteristic adjusting device to  
6 adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent  
7 electromagnetic energy using the data from the two-wave mixing interferometer.

1           25.     The system of Claim 23, the system further comprising:  
2 the two-wave mixing interferometer communicatively coupled to the wave characteristic  
3 controlling system; and  
4 the wave characteristic controlling system operable to adjust a parameter of the two-wave mixing  
5 interferometer.

1           26.     The system of Claim 23, the system further comprising:  
2     a synthetic signal generator;  
3     the synthetic signal generator situated in a path of the probe beam of coherent electromagnetic  
4     energy; and  
5     the synthetic signal generator adding a synthetic coherent electromagnetic energy signal to the  
6     probe beam of coherent electromagnetic energy.

1           27.     The system of Claim 26 wherein the wave characteristic controlling system  
2     directs the wave characteristic adjusting device to adjust the wave characteristic of the either one  
3     of the probe beam or the pump beam of coherent electromagnetic energy using information about  
4     the synthetic signal generator.

1           28.     The system of Claim 23, the system further comprising:  
2     the synthetic signal generator communicatively coupled to the wave characteristic controlling  
3     system; and  
4     the wave characteristic controlling system operable to direct the synthetic signal generator to add  
5     the synthetic coherent electromagnetic energy signal to the probe beam of coherent  
6     electromagnetic energy.

1           29.     The system of Claim 23, the system further comprising:  
2     a database having information;  
3     the database communicatively coupled to the wave characteristic controlling system; and  
4     the wave characteristic controlling system operable to direct the wave characteristic adjusting  
5     device to adjust the wave characteristic of the either one of the probe beam or the pump beam of  
6     coherent electromagnetic energy using the information from the database.

1           30.     The system of Claim 28 wherein the information in the database is information  
2     about the manufactured object.

1           31.     The system of Claim 28 wherein the information in the database is information  
2     obtained from a previous detection.

1           32.     The system of Claim 23, the system further comprising:  
2     a representation of the manufactured object; and  
3     the wave characteristic controlling system operable to direct the wave characteristic adjusting  
4     device to adjust the wave characteristic of the either one of the probe beam or the pump beam of  
5     coherent electromagnetic energy using the representation of the manufactured object.

1           33.     The system of Claim 32 wherein the representation of the manufactured object is  
2 a computer-aided-drafting representation of the manufactured object.

1           34.     The system of Claim 23, the system further comprising:  
2 a shape measuring device;  
3 the shape measuring device communicatively coupled to the wave characteristic controlling  
4 system;  
5 the shape measuring device operable to measure the shape of the manufactured object; and  
6 the wave characteristic controlling system operable to direct the wave characteristic adjusting  
7 device to adjust the wave characteristic of the either one of the probe beam or the pump beam of  
8 coherent electromagnetic energy using an information from the shape measuring device.

1           35.     A wave characteristic controlling system operable to direct at least one wave  
2 characteristic adjusting device to adjust a wave characteristic in at least one beam of coherent  
3 electromagnetic energy, the at least one beam of coherent electromagnetic energy being used in a  
4 two-wave mixing interferometer operable to detect at least one sonic energy signal in a  
5 manufactured object, the frequency controlling system comprising:  
6 at least one processor;  
7 at least one wave characteristic controlling circuitry communicatively coupled to the processor;  
8 the as at least one processor determining a desired wave characteristic of the at least one beam of  
9 coherent electromagnetic energy; and  
10 the at least one wave characteristic controlling circuitry operable to direct the at least one  
11 frequency shifting device.

1           36.     The wave characteristic controlling system of Claim 35, the wave characteristic  
2 controlling system further comprising:  
3 a programmable circuitry communicatively coupled to the processor; and  
4 the processor determining the desired wave characteristic using the programmable circuitry.

1           37.     The wave characteristic controlling system of Claim 35, the wave characteristic  
2 controlling system further comprising:  
3 a readable memory device communicatively coupled to the processor.

1           38.     The wave characteristic controlling system of Claim 37, the wave characteristic  
2 controlling system further comprising:  
3 a database stored on the readable memory device; and

the processor determining the desired wave characteristic from the database stored on the readable memory device.

39. The wave characteristic controlling system of Claim 37, the wave characteristic controlling system further comprising:  
a representation of the manufactured object stored on the readable memory device; and  
the processor determining the desired wave characteristic from the representation of the manufactured object stored on the readable memory device.

40. A method for testing a physical attribute of a manufactured object, the method comprising:  
generating an ultrasonic signal associated with the manufactured object with at least one laser pulse;  
measuring the ultrasonic signal with a two wave mixing interferometer, the two-wave mixing interferometer having a probe beam of coherent electromagnetic energy and a pump beam of coherent electromagnetic energy;  
scanning the probe beam of coherent electromagnetic energy across the manufactured object, the probe beam of coherent electromagnetic energy reflecting from the manufactured object with an altered wave characteristic caused by a scanning motion of the probe beam; and  
adjusting a wave characteristic of at least one beam of coherent electromagnetic energy with at least one wave characteristic adjusting device; the wave characteristic adjustment compensating for the altered wave characteristic caused by the scanning motion of the probe beam of the two-wave mixing interferometer.

41. The method of Claim 40 wherein the at least one wave characteristic adjusting device is situated in the optical path of the pump beam.

42. The method of Claim 40 wherein the at least one wave characteristic adjusting device is situated in the optical path of the probe beam.

43. The method of Claim 40, the method further comprising:  
directing the at least one wave characteristic adjusting device with a wave characteristic controlling system.

44. A method for measuring a physical attribute of a manufactured object, the method comprising:  
initiating at least one sonic energy signal associated with the manufactured object with a sonic energy signal generator;



5 measuring the sonic energy signal with a two-wave mixing interferometer;  
6 the two-wave mixing interferometer having a pump beam of coherent electromagnetic energy  
7 and a probe beam of coherent electromagnetic energy, the probe beam of coherent  
8 electromagnetic energy being scanned across the manufactured object, the probe beam reflecting  
9 from the object with an altered wave characteristic caused by the scanning motion of the probe  
10 beam; and  
11 adjusting device adjusting a wave characteristic of at least one beam of coherent electromagnetic  
12 energy with at least one wave characteristic adjusting device situated in a path of the at least one  
13 beam of coherent electromagnetic energy;  
14 the wave characteristic compensating for the altered wave characteristic caused by the scanning  
15 motion of the probe beam of the two-wave mixing interferometer.

1 45. The method of Claim 44 wherein the at least one wave characteristic adjusting  
2 device is situated in the optical path of the probe beam of coherent electromagnetic energy.

1 46. The method of Claim 44 wherein the at least one wave characteristic adjusting  
2 device is situated in the optical path of the pump beam of coherent electromagnetic energy.

1 47. The method of Claim 44, the method further comprising:  
2 directing the at least one wave characteristic adjusting device with a wave characteristic  
3 controlling system.

1 48. A method for detecting a sonic energy signal associated with a manufactured  
2 object with a two-wave mixing interferometer, the two-wave mixing interferometer scanning a  
3 probe beam across a surface of the manufactured object, the two-wave mixing interferometer  
4 comprising:  
5 generating at least one beam of coherent electromagnetic energy with at least one coherent  
6 electromagnetic energy generator; and  
7 adjusting a wave characteristic of the at least one beam of coherent electromagnetic energy to  
8 compensate for the wave characteristic distortion caused by a scanning motion of the probe beam  
9 of the two-wave mixing interferometer by controlling the at least one coherent electromagnetic  
10 energy generator with at least one wave characteristic controlling circuitry communicatively  
11 coupled to the at least one coherent electromagnetic energy generator.

1 49. The method of Claim 48 wherein the at least one beam of coherent  
2 electromagnetic energy is the probe beam of the two-wave mixing interferometer.

1           50.     The method of Claim 48 wherein the at least one beam of coherent  
2 electromagnetic energy is pump beam of the two-wave mixing interferometer.

1           51.     The method of Claim 48, the method further comprising:  
2 directing the wave characteristic controlling circuitry with a wave characteristic controlling  
3 system communicatively coupled to the wave characteristic controlling circuitry.

1           52.     A method for adjusting a wave characteristic of a beam of coherent  
2 electromagnetic energy with a wave characteristic adjusting device, the beam of coherent  
3 electromagnetic energy being of a two-wave mixing interferometer, the method comprising:  
4 selectively passing the beam of coherent electro-magnetic energy through a polarized beam  
5 deflector situated in a path of the beam of coherent electromagnetic energy to a first electro-optic  
6 phase modulator if an electro-optic polarizer situated in the path of the beam of coherent  
7 electromagnetic energy has a first specific operating characteristic;  
8 continuously altering a wave characteristic of the beam of coherent electromagnetic energy with  
9 the electro-optic phase modulator;  
10 selectively deflecting the beam of coherent electromagnetic energy from the polarized beam  
11 deflector to the second electro-optic phase modulator if the electro-optic polarizer has a second  
12 specific operating characteristic;  
13 continuously altering the wave characteristic of the beam of coherent electromagnetic energy  
14 with the second electro-optic phase modulator;  
15 the electro-optic polarizer operable to switch modes; and  
16 the wave characteristic of the beam of coherent electromagnetic energy being altered to  
17 compensate for a wave characteristic distortion caused by a scanning motion of a probe beam of  
18 the two-wave mixing interferometer.

1           53.     The method of Claim 52 wherein the beam of coherent electromagnetic energy is  
2 the probe beam of the two-wave mixing interferometer.

1           54.     The method of Claim 52 wherein the beam of coherent electromagnetic energy is  
2 a pump beam of the two-wave mixing interferometer.

1           55.     A method for adjusting a wave characteristic of a beam of coherent  
2 electromagnetic energy with a wave characteristic adjusting device, the beam of coherent  
3 electromagnetic energy being of a two-wave mixing interferometer, the method comprising:  
4 adjust a wave characteristic of the beam of coherent electromagnetic energy by a specific amount  
5 in a specific direction with at least one electro-optic phase modulator situated in a path of the

6 beam of coherent electromagnetic energy, the wave characteristic adjustable to compensate for a  
7 wave characteristic distortion caused by a scanning motion of a probe beam of the two-wave  
8 mixing interferometer.

1 56. The method of Claim 55 wherein the beam of coherent electromagnetic energy is  
2 the probe beam of the two-wave mixing interferometer.

1 57. The method of Claim 55 wherein the beam of coherent electromagnetic energy is  
2 a pump beam of the two-wave mixing interferometer.

1 58. A method for adjusting a wave characteristic of a beam of coherent  
2 electromagnetic energy with a wave characteristic adjusting device, the beam of coherent  
3 electromagnetic energy being of a two-wave mixing interferometer, the method comprising:  
4 selectively passing the beam of coherent electromagnetic energy through at least one of a  
5 plurality of electro-optic phase modulators; and  
6 adjusting the wave characteristic of the beam of coherent electromagnetic energy by amounts  
7 and in directions selectively determined, the adjusting being performed by the at least one of the  
8 plurality of electro-optic phase modulators, the wave characteristic of the beam of coherent  
9 electromagnetic energy being adjusted to compensate for a wave characteristic distortion caused  
10 by a scanning motion of a probe beam of the two-wave mixing interferometer.

1 59. The method of Claim 58 wherein the beam of coherent electro-magnetic energy is  
2 the probe beam of coherent electromagnetic energy of the two-wave mixing interferometer.

1 60. The method of Claim 58 wherein the beam of coherent electro-magnetic energy is  
2 a pump beam of coherent electromagnetic energy of the two-wave mixing interferometer.

1 61. A method for detecting a sonic energy signal associated with a manufactured  
2 object, the method comprising:  
3 scanning a probe beam of coherent electromagnetic energy across a surface of the manufactured  
4 object;  
5 the probe beam reflecting from the manufactured object with an altered wave characteristic  
6 indicative of a scanning motion of the probe beam;  
7 directing the probe beam to a two-wave mixing interferometer;  
8 passing either one of the probe beam or the pump beam of coherent electromagnetic energy  
9 through a wave characteristic adjusting device, the wave characteristic adjusting device  
10 communicatively coupled to a wave characteristic controlling system;

adjusting a wave characteristic of the either one of the probe beam or the pump beam with the wave characteristic adjusting device;  
directing the pump beam to the two-wave mixing interferometer; and  
directing the wave characteristic adjusting device with the wave characteristic controlling system to adjust the wave characteristic of the either one of the probe beam or the pump beam.

62. The method of Claim 61, the method further comprising:  
passing data to the wave characteristic controlling system from the two-wave mixing interferometer; and  
directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system using the data from the two-wave mixing interferometer.

63. The method of Claim 61, the method further comprising:  
adjusting a parameter of the two-wave mixing interferometer with the wave characteristic controlling system.

64. The method of Claim 61, the method further comprising:  
adding a synthetic coherent electromagnetic energy signal to the probe beam of coherent electromagnetic energy with a synthetic signal generator situated in a path of the probe beam of coherent electromagnetic energy.

65. The method of Claim 64 wherein the wave characteristic controlling system directs the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or pump beam of coherent electromagnetic energy using information about the synthetic signal generator.

66. The system of Claim 65, the method further comprising:  
directing the synthetic signal generator to add the synthetic coherent electromagnetic energy signal to the probe beam of coherent electromagnetic energy, the directing being performed by the wave characteristic controlling system.

67. The method of Claim 61, the method further comprising:  
directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using an information from a database.

68. The method of Claim 67 wherein the information in the database is information about the manufactured object.

69. The method of Claim 67 wherein the information in the database is information obtained from a previous detection.

70. The system of Claim 61, the system further comprising:  
directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using a representation of the manufactured object.

71. The method of Claim 70 wherein the representation of the manufactured object is a computer-aided-drafting representation of the manufactured object.

72. The method of Claim 70, the method further comprising:  
directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using data from the two-wave mixing interferometer.

73. The method of Claim 61, the method further comprising:  
measuring a shape of the manufactured object with a shape measuring device communicatively coupled to the wave characteristic controlling system; and  
directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or the pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using an information from the shape measuring device.

74. The method of Claim 73, the method further comprising:  
directing the wave characteristic adjusting device to adjust the wave characteristic of the either one of the probe beam or pump beam of coherent electromagnetic energy with the wave characteristic controlling system, the wave characteristic controlling system using the data from the two-wave mixing interferometer.

75. A method to direct at least one wave characteristic adjusting device to adjust a wave characteristic in at least one beam of coherent electromagnetic energy using a wave characteristic controlling system, the at least one beam of coherent electromagnetic energy being

4 used in a two-wave mixing interferometer, the two-wave mixing interferometer operable to  
5 detect at least one sonic energy signal in a manufactured object, the method comprising:  
6 determining a desired wave characteristic of the at least one beam of coherent electromagnetic  
7 energy with at least one processor; and  
8 the operable to directing at least one wave characteristic adjusting device with at least one wave  
9 characteristic controlling circuitry communicatively coupled to the at least one processor.

1       76.     The method of Claim 75, the method further comprising:  
2 determining the desired wave characteristic with a processor, the processor using a  
3 programmable circuitry communicatively coupled to the processor.

1       77.     The method of Claim 75, the method further comprising:  
2 determining the desired wave characteristic with the processor, the processor determining the  
3 desired wave characteristic from a database stored on a readable memory device.

1       78.     The method of Claim 75, the method further comprising:  
2 determining the desired wave characteristic with the processor, the processor determining  
3 the desired wave characteristic from a representation of the manufactured object stored on  
4 a readable memory device.